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NOVEMBER FLOWERS.

FRANK S. COLLINS.

IN records of seasonal occurrence, it will be found that more attention has been given to the beginning than to the end of the season. The finding of the first flower of the year of any species, the first hearing of the song of some bird, is an inspiring event, but after we have seen one and heard the other for months, the closing record is less interesting. Again, the latter is more difficult to obtain, and to be sure of the date of the fading of the last flower, the departure of the last bird of a species, is impossible. When you gather your first *Hepatica*, hear your first bluebird, you can make your record, and that is all there is to be done about it; but if you see a wild rose on the first of November, you must continue to watch for wild roses all through the month, and then feel that there were probably some that you did not see. But though no final date can be given with certainty, a list of species observed in some period at the close of the season, may show some interesting details. A list of this kind was made by the late Bradford Torrey, and will be found in his volume of pleasant and at the same time accurate nature studies, *A Rambler's Lease*, published in 1890. It appeared previously like most of the other essays in the volume in the *Atlantic Monthly*. It gives a list of plants that he found in bloom in the open in November, 1888, as also notes on butterflies and birds observed during the month. I have often thought that it would be interesting to compare a similar list of flowers in November of some other year, and see in what proportion the species were the same. I had been unable to make up such a list, as in the case of a man whose occupation demands a day's work every week day, while

he can in the spring welcome the coming guest before and after the time when the whistle blows, literally or metaphorically, there is no daylight for speeding the parting guest in the autumn. Once, on November 4, 1900, when riding on my bicycle from Malden to Revere Beach and back, I made note of the flowers I saw in bloom, conspicuous enough to be visible as I went by; there were 22, not counting two manifestly different "mustards" that I did not recognize specifically.

In November, 1913, for the first time I was able to give some day-time, every day, to making notes of this kind, and the present paper is the result of these notes, and similar ones in November, 1914, in the town of Eastham, Barnstable County, Massachusetts. In each year I was away from Eastham part of the month; in 1913 the observations cover the period from the seventeenth to the thirtieth, in 1914 from the first to the twentieth. Mr. Torrey records finding some species only in a single limited station, and it is of course probable that similar stations for other species were overlooked, both in his case and in mine; completeness in such matters is impossible. Mr. Torrey's list is given by common names, "omitting Latin titles,—somewhat unwillingly, I confess —" he says, but I think I have rightly identified all the species except one, "common blue violet"; one looks back with a mild melancholy to the good times, now gone forever, when there was such a thing as the "common blue violet."

In the following tabulation all the species observed by Mr. Torrey and myself are in a single list, in the order of the Manual Check List; there are four vertical columns at the right; a check in the first indicates the presence of the species in Mr. Torrey's November, 1888 list; in the second column, its occurrence in November, 1913; in the third, its occurrence in November, 1914; in the fourth column are indicated the species that were able, by the unusually mild weather of the close of 1913, to continue blooming into December of that year.

	Nov. '88	Nov. '13	Nov. '14	Dec. '13
<i>Spiranthes cernua</i>	+			
<i>Polygonella articulata</i>	+		+	
<i>Polygonum aviculare</i>	+	+	+	
<i>Polygonum Persicaria</i>			+	
† <i>Chenopodium carinatum</i>			+	
<i>Phytolacca decandra</i>			+	

	Nov. '88	Nov. '13	Nov. '14	Dec. '13
<i>Scleranthus annuus</i>	+	+	+	+
<i>Mollugo verticillata</i>			+	
<i>Cerastium vulgatum</i>	+		+	
<i>Dianthus Armeria</i>	+			
<i>Saponaria officinalis</i>			+	
<i>Spergula arvensis</i>		+	+	+
<i>Spergularia rubra</i>	+		+	
<i>Stellaria media</i>	+			
<i>Delphinium Consolida</i>	+			
<i>Ranunculus acris</i>	+	+		
<i>Ranunculus repens</i>	+			
<i>Chelidonium majus</i>	+			
* <i>Corydalis sempervirens</i>	+			
<i>Brassica arvensis</i>		+	+	+
<i>Brassica Napus</i>		+	+	
<i>Cakile edentula</i>	+		+	
<i>Capsella Bursa-pastoris</i>	+	+	+	+
<i>Lepidium virginicum</i>	+	+	+	+
<i>Raphanus Raphanistrum</i>	+			
<i>Sisymbrium altissimum</i>			+	
<i>Sisymbrium officinale</i> var. <i>leiocarpum</i>	+			
* <i>Hamamelis virginica</i>	+			
* <i>Geum canadense</i>	+			
<i>Potentilla argentea</i>	+		+	
<i>Potentilla canadensis</i>	+			
<i>Rosa virginiana</i>			+	
<i>Baptisia tinctoria</i>			+	
<i>Medicago lupulina</i>	+			
* <i>Melilotus alba</i>	+			
<i>Trifolium hybridum</i>	+		+	
<i>Trifolium pratense</i>	+	+	+	+
<i>Trifolium repens</i>	+			
<i>Erodium cicutarium</i>	+	+	+	+
* <i>Geranium Robertianum</i>	+			
<i>Malva rotundifolia</i>	+	+	+	+
* <i>Viola pedata</i>	+			
* <i>Viola tricolor</i>	+			
<i>Oenothera puricata</i>	+		+	
* <i>Oenothera pumila</i>	+			
<i>Daucus Carota</i>	+		+	
<i>Limonium carolinianum</i>			+	
<i>Anagallis arvensis</i>			+	
* <i>Gentiana crinita</i>	+			
<i>Leonurus cardiaca</i>	+		+	

	Nov. '88	Nov. '13	Nov. '14	Dec. '13
<i>Prunella vulgaris</i>	+			
<i>Linaria canadensis</i>	+	+	+	+
<i>Linaria vulgaris</i>	+		+	
* <i>Campanula rapunculoides</i>	+			
<i>Achillea Millefolium</i>	+	+	+	+
<i>Ambrosia artemisiifolia</i>			+	
<i>Anaphalis margaritacea</i>	+			
<i>Antennaria plantaginifolia</i>	+			
<i>Anthemis Cotula</i>	+		+	
<i>Arctium minus</i>	+			
* <i>Aster cordifolius</i>	+			
* <i>Aster divaricatus</i>	+			
* <i>Aster lateriflorus</i>	+			
<i>Aster ericoides</i>		+	+	+
<i>Aster linariifolius</i>	+		+	
* <i>Aster multiflorus</i>	+			
<i>Aster novi-belgii</i>	+		+	
<i>Aster patens</i>		+	+	
* <i>Aster puniceus</i>	+			
* <i>Aster vimineus</i>	+			
* <i>Aster undulatus</i>	+			
<i>Chrysanthemum Leucanthemum</i> var. <i>pinnatifidum</i>		+	+	
† <i>Chrysopsis falcata</i>		+	+	+
<i>Cirsium arvense</i>	+			
<i>Cirsium discolor</i>		+	+	
<i>Erigeron canadensis</i>	+		+	
<i>Erigeron ramosus</i>	+		+	
<i>Gnaphalium polycephalum</i>	+	+	+	
<i>Leontodon autumnalis</i>	+		+	
<i>Rudbeckia hirta</i>	+			
<i>Senecio vulgaris</i>	+	+	+	+
<i>Solidago bicolor</i>	+			
* <i>Solidago caesia</i>	+			
* <i>Solidago canadensis</i>	+			
* <i>Solidago juncea</i>	+			
<i>Solidago nemoralis</i>	+	+	+	+
<i>Solidago rugosa</i>	+			
<i>Solidago sempervirens</i>	+	+	+	
<i>Sonchus asper</i>			+	
<i>Sonchus oleraceus</i>	+			
<i>Tanacetum vulgare</i>	+			
<i>Taraxacum officinale</i>	+		+	

The 92 species in the list represent 26 families; *Compositae* with 38 species, *Cruciferae* with 8, *Caryophyllaceae* with 6, *Leguminosae* with 5, *Rosaceae* with 4, no other with more than 3. The *Compositae* are especially a family of autumn plants with us, and their predominance is not unnatural, though the extreme predominance may be somewhat surprising, 41 per cent, against 13 per cent of the flowering plants in Gray's Manual. The monocotyledons have only one species, the trees one species; both these in the Torrey list, neither in mine. Of the 92 species, 40 are introduced, being 43 per cent; if we exclude the *Compositae* with the asters and golden rods, all native, 55 per cent are introduced species; only 17 per cent of the flowering plants in the Manual are introduced. Two reasons may be suggested for their predominance; immigrants that have established themselves probably represent the few hardy and persistent species among the many that have at some time or other landed on our shores, and perhaps taken out their first papers, but never secured citizenship. Many of these species come from lands where the season of vegetation is longer than with us; they have not completed what would be their normal period at home at a time when native plants are quite through for the year. Two plants have seemed to me good instances of this latter condition; *Senecio vulgaris* and *Erodium cicutarium*. Little is seen of either at midsummer, but they are conspicuous in early spring and late autumn; and at any time through the winter a few warm days will bring them out.

Some of my species are in the list on single observations, and Mr. Torrey notes the same as to some of his; but with others, the case was different; they came not as spies, but whole battalions. *Aster ericoides*, which Mr. Torrey did not see at all, was very abundant in Eastham the first part of November; I saw fields showing white with it at quite a distance. Large plants of *Cirsium discolor* were frequent, mostly out of bloom and even the seeds gone, but still a few perfect heads on each, and here and there an individual quite in full bloom. Three times I saw *Rosa virginiana*, only a single flower each time, but that as perfect as in June. Two plants in Mr. Torrey's list, *Viola pedata* and *Antennaria plantaginifolia*, may be considered as precocious rather than belated, none in my list.

Mr. Torrey's list had Wellesley for a center, but covered quite an area; six species, he states, he did not collect himself, but they were contributed by a friend whose collecting extended into Essex County.

Two, *Delphinium Consolida* and *Viola tricolor*, were manifestly garden escapes. My own list covers Eastham only, about seven square miles. His list covers a much greater area in a more fertile region; as a slight offset may be reckoned that the climate at Eastham is milder than that at Boston; in the autumn of 1914 the Dahlias here were in excellent condition after those at Boston, and even on the Buzzard's Bay shore of the Cape, were destroyed by the frost. In the list I have put a star (*) at the left of the name in each case where a species reported by him is not to be expected in my region, and a dagger (†) to indicate the reverse. Of these species, it will be seen, there are twenty and two respectively. This leaves seventy species that might be expected in both regions; of these he found twenty-one that I did not, I found eighteen that he did not; thirty-one species we both found, a sufficiently large proportion, it seems to me, to show that certain species have the capacity to continue flowering as long as weather conditions permit, while others, whose flowering season begins no earlier, have a definite time for getting through, with little regard to conditions of temperature. No grasses were included in Mr. Torrey's list and I do not know whether he noticed grasses. I found three species, one native and two introduced; *Spartina patens*, *Bromus tectorum* and *B. hordeaceus* were in flower in Eastham in November, 1914.

That these lists are by no means complete may be judged from the fact that in going over my "bicycle" list, referred to above, I find that I noticed three species that do not appear in the table I have given; *Trifolium arvense*, *Cichorium Intybus* and *Artemisia caudata*. If lists could be made out for other localities, a comparison might lead to definite conclusions; it is to be hoped that the opportunity may come to some readers of RHODORA, and be improved by them.

NORTH EASTHAM, MASSACHUSETTS.

THREE OF CLAYTON'S OAKS IN THE BRITISH MUSEUM.

C. S. SARGENT.

A VISIT a few months ago to the region in Gloucester County, Virginia, where John Clayton lived for many years, led me to examine last summer the specimens of Oaks collected by him and preserved in the British Museum. Three of these specimens are of some interest.

1. Clayton's *Quercus rubra* seu *Hispanica* hic dicta, foliis amplius varie profundeque incisus was described by Gronovius as *Quercus foliorum sinubus obtusis, angulis lanceolatis seta terminatis integerrimis vix divisus*. This is the first synonym quoted by Linnaeus under his description of *Quercus rubra* in the *Species Plantarum* and that on which his diagnostic phrase was based. The other synonym quoted by Linnaeus and by Gronovius is *Quercus esculi divisura, foliis amplioribus aculeatis* of Plukenet & Catesby. Plukenet's figure of a single leaf might possibly pass for a leaf of the Red Oak, although it looks more like some form of *Q. coccinea* or of *Q. velutina*. Catesby's plate well represents *Q. falcata*, although a single unattached and uncolored fruit on this plate might represent a small fruit of *Quercus rubra*. Catesby calls his Oak the Red Oak. In the southern states *Quercus falcata* is always called Red Oak, and if the name Spanish Oak is ever used for it this name is not common. Clayton's specimen is clearly the digitate form of *Quercus falcata*. Linnaeus's description of his *Quercus rubra*, "*Q. foliis obtuse-sinuatis, setaceo-mucronatis*," means little and might apply to several species as well as to *Q. rubra*, and if his species was based on the descriptions of earlier authors *Q. rubra* should be the name of the tree now called *Q. falcata* or *Q. digitata*. Linnaeus's *Q. rubra* β in the *Species Plantarum*, judging by the figures of Catesby & Plukenet quoted by him, although they represent only single leaves, was probably what we now call *Quercus rubra*.

2. This is a specimen of a single leaf of *Quercus velutina*, under which is written "*Quercus foliorum, sinubus obtusis, angulis lanceolatis seta terminatis integerrimis vix divisus*, Fl. Virg. p. 117, our common black Oak, Bartram.

Quercus foliis obtuse sinuatis setaceo-mucronatis, Linn. Syst. gen. 549, n. 9."

Clayton's description was not quoted by Linnaeus and Clayton's

specimen may not have been collected before 1753. Clayton, confounding two species, referred his specimen of the Black Oak to the species which Linnaeus called *Q. rubra* in the Species Plantarum and in the tenth edition of the Systema Naturae.

3. Clayton's *Quercus Castaneae foliis, glandibus maximis* is a flowering specimen with leaves nearly one-third grown. The long petioles and the serrature of the leaves show that it is *Quercus Muehlenbergii*. Two Chestnut Oaks naturally grow in Gloucester County, where *Q. Michauxii* is the more common of the two. I saw only a few trees of *Q. Muehlenbergii* and only one individual of *Q. Prinus*, a very large tree growing in the grounds of an old colonial estate where it had probably been planted. Clayton evidently confounded two species as his "glandibus maximis" must have belonged to *Q. Michauxii*, and it is probable that two and perhaps three Chestnut Oaks are included in Linnaeus's *Quercus Prinus*. "Denticulis rotundatis uniformibus" in his description would apply to *Q. Prinus* and *Q. Michauxii*. Plukenet's figure quoted by Linnaeus represents a single leaf which might belong to either *Q. Prinus* or *Q. Michauxii*, but Catesby's full-page plate and his description also quoted by Linnaeus clearly represent *Q. Michauxii*. It seems necessary therefore to restore the name *Q. Prinus* L. to the tree now called *Q. Michauxii* Nutt. and adopt again for the Rock Chestnut Oak the name of *Q. montana* Willd., the name used for this tree by Pursh and by Gray in all editions of his Manual published during his life and by other authors until Engelmann selected the Rock Chestnut Oak as the type of *Q. Prinus* on the mistaken idea that it was the common Chestnut Oak of Virginia, meaning by Virginia, of course, that part of the state in which the early botanists collected. *Quercus Prinus* is an Appalachian tree and rarely grows near the coast, and it is *Q. Michauxii* which would have attracted the attention of Banister, Clayton and Catesby who worked chiefly in the coast region.

Photographs of these three specimens of Clayton may be seen in the Herbarium of the Arboretum.

ARNOLD ARBORETUM.

SYSTEMATIC STUDIES ON *OENOTHERA*,—V.*OE. ROBINSONII* AND *OE. CLEISTANTHA*, SPP. NOVV.

HARLEY HARRIS BARTLETT.

(Plate 111.)

It has been shown ¹ that "*Oenothera cruciata*" of the Manuals is an aggregate of genetically unrelated elements with little morphological similarity aside from their linear petals. A number of these elements have been separately defined, namely, *Oe. cruciata* Nutt., *Oe. venosa* Shull & Bartlett, *Oe. atrovirens* Shull & Bartlett, and *Oe. stenomeris* Bartlett. Moreover, Bicknell ² has described a cruciate-flowered ally of *Oe. Oakesiana*, *Oe. stenopetala* Bicknell, thus greatly strengthening the evidence that the character of cruciateness has originated independently in several lines of descent.

In this article two more cruciate species are proposed, *Oe. Robinsonii* and *Oe. cleistantha*. The former has figured somewhat in genetical literature as an "elementary species of *Oe. cruciata*." It was originally collected by Robinson in 1902 at Jaffrey, New Hampshire, and sent to de Vries. For several years prior to 1913 the strain had been lost from the experiment gardens, but Dr. Robinson very kindly collected it again at Jaffrey and sent seeds to the writer. These were planted last year, and gave a uniform culture of very slender-flowered plants which agree with all that we know of the strain originally cultivated by de Vries.

There has been some confusion in the literature between *Oe. Robinsonii* and a form described by MacDougal which originated from seeds collected at Hudson Falls (Sandy Hills), New York, the type locality of *Oe. venosa* and *Oe. atrovirens*. Since my former article on the cruciate forms (l. c.) was published, I have received numerous seed collections from Mr. Stewart Henry Burnham, of Hudson Falls, which may make it possible to clear up this confusion as well as to determine whether *Oe. venosa* and *Oe. atrovirens* respectively are more closely

¹ Bartlett, H. H. An account of the cruciate-flowered *Oenotheras* of the subgenus *Onagra*. Am. Journ. Bot. I (1914) pp. 226-243.

² Bicknell, E. P. The ferns and flowering plants of Nantucket — XII. Bull. Torr. Bot. Club, XLI (1914) pp. 71-87.

allied to broad-petaled species of that region than they are to one another. Mr. Burnham was the original collector of *Oc. venosa* and *Oc. atrovirens* and obtained the seeds through which these species were introduced into our experiment gardens. The new seed collections are from the same locality as those of 1903. Since Mr. Burnham has sent entire inflorescences it seems safe to say, even before the seeds are planted, that *Oc. Robinsonii* is not among the forms which he has collected. Nevertheless, there is enough likeness between *Oc. venosa* and *Oc. Robinsonii* so that a close genetic relationship between them seems not unlikely.

Oenothera cleistantha was collected about ten years ago at Huntington, Long Island, by Dr. Geo. Harrison Shull. He has grown it extensively for experimental purposes, and the writer has also had it under observation during one season. Unlike *Oc. Robinsonii*, it has no obvious affinity with any *Onagra* thus far described, either cruciate or broad-petaled. In general appearance it is more similar to the *Oc. venosa* of northern New York than to the *Oc. stenomeris* of Maryland, but genetically it is probably not closely related to either.

Oenothera Robinsonii Bartlett sp. nov. Biennis. Rosula matura ca. 50 cm. diametro; foliis maximis 30×4 cm., mediocribus $20-25 \times 3.5$ cm., viridibus, longe petiolatis, spatulato-lanceolatis, modice bullatis, ad basin versus argute dentatis, utrinque exigue pubescentibus; pilis brevibus appressis. Planta matura ca. 60 cm. alta. Caulis proprius sursum ramos floriferos deorsum ramos abortivos ferens. Rami radicales numerosi (10-20) cauli proprio similes. Caules latere insolito rubri, altrorsus maculosi, tuberculato-pilosi, pilis ascendentibus, tuberculis cauli concoloribus. Folia inferiora caulina eis rosulae similia, ca. 13×3 cm., media ca. 10×2.2 cm. Bractae foliaceae, persistentes, ovariis longiores sed fructibus maturis plerumque breviores, anguste lanceolatae, minute puberulae, supra pilis aliis acutis, aliis viscidis cylindricis, apice rotundatis, subtus viscidis solis vestitae. Hypanthium gracillimum 33-40 mm. longum, 1.5 mm. crassum, pilis aliis paucissimis mediocribus ascendentibus, aliis numerosis brevibus erectis viscidis tectum. Calyx proprius pubescentia hypanthio similis, inexpansus gemmam prismaticam quadrangulam 15 mm. longam 3.5 mm. crassam formans, apicibus liberis 3 mm. longis, paulum infraterminalibus, erectis, parallelis, sparsim appresso-pubescentibus. Petala margine viridi-flavescentia, medio flava, staminibus breviora, 8 mm. longa, 2 mm. lata, supra glabra, subtus sparsissime viscido-puberula. Stigma antheris 5-6 mm. longis circumdatum. Ovarium 10 mm. longum gracillimum, pilis et longis ascendentibus rubro- vel viridi-tuberculatis et brevibus erectis densis viscidis tectum. Fructus 26 mm. longi, prope basin 6 mm. crassi,

apicem versus sensim angustati, minute viscido-puberuli, pubescentes, et sparsim tuberculato-pilosi, tuberculis viridibus; apicibus productis brevissimis truncatis vel paululo emarginatis.— Cultivated from seeds collected at Jaffrey, New Hampshire, by B. L. Robinson; garden specimens, *Bartlett* 3505, 3509, 3517, 3669, 3670. *Oc. Robinsonii* differs from *Oc. venosa* chiefly in the smaller size of the former, in the more sharply dentate leaves, the narrower bracts, the dense erect viscid puberulence of the longer, more slender buds and the shorter calyx tips. Most of these differences are obscure in herbarium material. The range of variation in bud length, for example, overlaps in the two species. Nevertheless the difference is striking enough in plants cultivated under identical conditions, as were those shown in Plate 111.

Oenothera cleistantha Shull & Bartlett sp. nov. Biennis. Rosulae folia oblanceolata, ad petiolum versus distanter et acute sinuato-dentata, maxima ca. 270×30 mm. Planta matura ca. 1 m. alta ex caule proprio obliquo et 10–15 ramis radicalibus constans. Caulis proprius infra inflorescentiam ca. 7 dm. longus, dense foliosus et ramosus, ramis 5–100 mm. longis, solum longioribus autumno vergente floriferis; inflorescentia terminalis 3–4 dm. longa, sublaxa, simplex vel spicis 1–4 lateralibus brevibus praedita, juventate paululo nutans, aetate erecta. Rami radicales late patentes, caule proprio longiores (ca. 13–14 dm. longi) infra medium ramis 5–15 tertiariis floriferis, maximis 6 dm. longis praediti, sursum solum ramulos brevis foliosos non fliferos ferentes. Caulis coloribus viride et rubro maculosus, crispato-pubescent et tuberculato-pilosus, tuberculis cauli concoloribus. Folia laete viridia, utrinque minute crispato-pubescentia, inferiora ca. 140×28 mm., media 100×22 mm. Bractae patentes, inferiores foliosae lanceolatae ca. 42×13 mm., superiores fructibus dimidio longiores. Hypanthium gracillimum 33–36 mm. longum, 1.5 mm. crassum, sparsim patenter pilosum et viscido-puberulum. Flores saepissime cleistogami. Calyx proprius inexpansus subquadrangulus 14 mm. longus, 4 mm. crassus, pilis viridi-tuberculatis longis, prope hypanthium vel reflexis vel erectis, prope apicem ascendentibus; apicibus liberis basi distantibus, 3 mm. longis, parallelis. Petala 10 mm. longa, 2.5 mm. lata. Stigma antheris circumdatum. Ovarium 11×2.5 mm., dense pilosum et puberulum, pilis trifloribus, I longissimis tuberculatis albis ascendentibus, II brevibus acutis crispatis, III brevissimis viscidis erectis. Fructus virides 30 mm. longi, prope basin 6.5 mm. crassi, apicem versus angustati, pubescentia ovario similes, subscabri, pilorum tuberculis viridibus; appendicibus productis 1 mm. longis, emarginatis.— Grown from seeds collected by Dr. Geo. H. Shull at Huntington, Long Island, N. Y.; garden specimens *Bartlett* 3511, 3557, 3592, 3646. The extreme leafiness and dense branching of this species are among its most striking characters. A more minute but very distinctive characteristic lies in the long hairs of the calyx, which are retrorse or perpendicular around the top

of the hypanthium, but elsewhere on the bud cone strongly ascending. As a rule the flower-buds never open.

BUREAU OF PLANT INDUSTRY, Washington, D. C.

EXPLANATION OF PLATE 111.

- Fig. a. *Oenothera Robinsonii*. Inflorescence of main stem.
Fig. b. *Oenothera Robinsonii*. Inflorescence of side branch (cf. fig. c).
Fig. c. *Oenothera venosa*. Inflorescence of side branch (cf. fig. b).
Fig. d. *Oenothera cleistantha*. Inflorescence of main stem, in fruit.
Fig. e. *Oenothera cleistantha*. Inflorescence of side branch, in flower.

THE NORTH AMERICAN REPRESENTATIVES OF DRYOPTERIS SPINULOSA, VAR. DILATATA.

M. L. FERNALD.

THE present writer, who has rarely intruded upon the preserves of the fern-specialists, ventures with some trepidation to discuss a plant which has already had more than its full share of attention. But, in an endeavor to settle as exactly as possible the identities of all the vascular plants known from Newfoundland, he has found himself constantly perplexed by the current treatments of the plant variously known in eastern America as *Dryopteris spinulosa* (Müll.) Kuntze, var. *dilatata* (Hoffm.) Underw. or *Aspidium spinulosum* (Müll.) Sw., var. *dilatatum* (Hoffm.) Hook. or *Dryopteris dilatata* (Hoffm.) Gray.

It has long been known that the common broad-fronded plant of the Hudsonian and Canadian areas of eastern America, which passes as *Dryopteris spinulosa*, var. *dilatata*, has the indusia quite glabrous, in this character exactly coinciding with the somewhat narrower-fronded *D. spinulosa* and diverging from var. *dilatata* of Europe in which the indusia, as regularly described by European authors, have the margins glandular-ciliate. In fact, in some American manuals *D. spinulosa* and its var. *dilatata* (or *D. dilatata*) are separated from var. *intermedia* (or *D. intermedia*) by their glabrous indusia, as opposed to the distinctly glandular indusia of the latter plant. In view of this departure from the European type it seems somewhat strange that American fern-students have clung so tenaciously to the name of the

European plant with glandular indusia and have so generally maintained it for the American plant with glabrous indusia. So fixed has been this tradition among American fern-students that, when the late B. D. Gilbert found an exceptional plant with glandular indusia, supposed by him to be an extreme of *D. dilatata*, he wrote:

"Babington, Sowerby, Smith, Moore, Hoffmann, Presl, DeCandolle, and most of the older botanists, regarded this [*D. dilatata*] as a distinct species. But all of them, whether they considered it a species or a variety, characterized it as having an 'indusium fringed with stalked glands.' American botanists, however, from an early period, made the point that the indusium was 'smooth and naked,' and this has been insisted upon as an indispensable requisite of the variety in this country. But is it so? If it has indusia with stalked glands in Europe, why may it not have them in this country also? It seems to me that the distinction is false, and cannot be regarded as imperative. The mere fact that much of the *dilatata* found here has a naked indusium does not preclude the possibility of a form that may agree with the English form." ¹ Gilbert then goes on to identify his unusual American plant with glandular indusia not as *D. dilatata* (true) but as *Lastraea dilatata*, var. *glandulosa* Moore or, as he renamed it, *Dryopteris spinulosa glandulosa*.

The writer is not at all confident that the American plant called by Gilbert *Dryopteris spinulosa glandulosa* and subsequently renamed by him *Nephrodium spinulosum fructuosum* ² has much in common with the plant of Moore; but Gilbert's argument, above quoted, does not change the fact that glandular indusia are practically unknown in the common plant of northeastern America now passing as *D. spinulosa*, var. *dilatata*. This is obvious not only from close study of the specimens, but from the writings of Gray, Eaton, Davenport, and a host of students of the present day; and in 1907 this common American plant was distinguished as *Aspidium spinulosum*, var. *dilatatum*, forma *anadenium* Robinson, RHODORA, ix. 84 (1907).

The chief object of the present note, however, is to call attention to a much more obvious character in which our plant departs very constantly from the European var. *dilatata*. In the common American plant the ovate or lanceolate scales of the stipe are very thin, translucent and soft in texture (like tissue paper), of a pale brown or slightly

¹ B. D. Gilbert, Fern Bull. viii. 10 (1900).

² Gilbert, List N. A. Pterid. 37 (1901).

rufescent color (essentially the cinnamon of Ridgway's Color Standards, but more dilute), sometimes a little deeper-colored near the center (about the warm sepia of Ridgway), and they rarely persist on the rhachis and very rarely on the rhachillas of the mature frond. In the European plant, on the other hand, the specimens fully agree with the European descriptions (too often drawn upon for American texts) in having the lance-attenuate scales very dark brown, usually blackish (closely matching in color the aniline black of Ridgway), and of comparatively firm texture, ordinarily quite like the dark basal scales of the stipe of *D. Goldiana*. These rather firm blackish scales usually persist to the summit of the mature stipe and (reduced in size) often extend well along the rhachis, and even along the rhachillas of the lower pinnae in some specimens. These characters, drawn from the European specimens in the Gray Herbarium and from an extensive suite of European material placed at the writer's disposal by Mr. Robert A. Ware, are, as said, in agreement with the European descriptions. For example, in his very detailed account of the plant in the British Isles, Moore said: "*Stipes* . . . densely scaly; the scales spreading, most numerous at the base, but usually abundant throughout the whole length of the stipes, and in the normal plant lanceolate-attenuate, and dark-centered like those of the crown, frequently almost black. *Rachis* . . . somewhat scaly, especially at the back, with small subulate more or less distinctly two colored scales."¹ Again, writing from the continental standpoint, Christ says: "Scales of the stipe smaller, black-brown, with paler margins."²

The glandular-ciliate margin of the indusium in the European plant is difficult to see except in perfect specimens; but the characteristic scales, not only in texture and color but in their comparative abundance, quickly separate the common European plant from the common plant so long mistaken for it in eastern America. In the Northwest, however, where so many identities with the European flora are known, the typical var. *dilatata* is found, much of the material from western Alaska, British Columbia and Washington and some from Oregon being quite inseparable, in the slender dark brown and rather persistent scales extending even along the middle pinnae, from the common European plant.

¹ Moore, Oct. Nat. Pr. Brit. Ferns, i. 226, 227 (1859).

² "Schuppen des Blattstiels schmäler, schwarzbraun mit blässerem Rande" — Christ, Farnkr. der Erde, 261 (1877).

That the common plant of eastern America has the scales paler-colored than in most European plants is not a new observation, though current descriptions and treatments of the plant might so indicate. The late D. C. Eaton explicitly said: "In European examples of [*Aspidium spinulosum*,] var. *dilatatum* the scales have a very conspicuous dark central spot or stripe. This is sometimes lacking in European specimens,¹ and generally so in North American. I notice a little of it in Oregon plants [typical var. *dilatatum* as above pointed out]." ² Still earlier, the learned Gustav Kunze, recognizing in the common plant of our northern latitudes and mountains its true affinity, as a variety or species closely related to typical *D. spinulosa*, with its thin and pale quickly deciduous scales and glabrous indusia, rather than to true var. *dilatata*, published the following luminous note, which has received less attention than it deserves from students of American ferns:

"The identity of *A[spidium] spinulosum*, Sw., *A. dilatatum*, Sw., *A. dumetorum*, W., and *A. intermedium*, W., as different forms of one species, cannot be doubted any longer. A peculiar variety of *A. spinulosum* occurs in the northern latitudes and on the mountains of the Southern States, which must be studied more closely in its native localities, as it may prove to be a distinct species. I have specimens of this form from Newfoundland (La Pylaie), Greenland, and Labrador (Breutel and Kurr), New England mountains, sterile (Tuckerman), and from the highest tops of the Black Mountains, North Carolina (Rugel). Cultivated specimens have been communicated to me from the botanical garden of St. Petersburg, (Dr. Fischer as *A. spinulosum americanum*,) and from that of Berlin. The lowest pair of the mostly opposite pinnae is *ascending and curved upwards*, and has a *different direction from the other pinnae*. The pinnulae are more deeply pinnatifid, with more and sharper teeth than in the common form; *those of the lowest pinnae, especially near the base, are much elongated downwards*, by which these pinnae assume a very irregularly triangular shape. The sori are nearer the middle nerve. The stipe is thickly covered with brown or redish paleae. If this form

¹ Eaton here referred to extreme variations in Europe, such as *Lastrea dilatata*, var. *glandulosa* Moore, with "fronds densely covered with stalked glands beneath....; scales....pale whole-coloured, or faintly two-coloured, broadly lanceolate-ovate" — See Moore, l. c. 226.

² Eaton, Ferns N. A. ii. 167 (1880).

should eventually prove to be a distinct species, the name of *A. campylopterum* would be appropriate.”¹

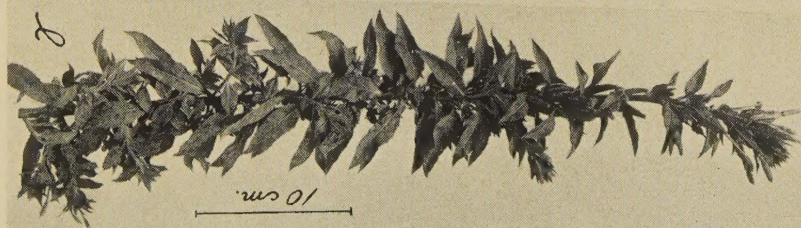
Here, apparently, is the first and only time (except that Kunze subsequently listed it without comment) that the common plant of the New England and Canadian uplands has been given the recognition it deserves. Except in stature, broader fronds and more elongate irregularly triangular lower pinnae, the plant is close to *Dryopteris spinulosa* and in our northern forests certainly grades into it. As a variety, however, it deserves recognition as

DRYOPTERIS SPINULOSA (Müll.) Kuntze, var. **americana** (Fischer), n. comb. *Aspidium spinulosum americanum* Fischer according to Kunze, Am. Journ. Sci. ser. 2, vi. 84 (1848), not *A. americanum* Davenp. Am. Nat. xii. 714 (1878). *A. campylopterum* Kunze, l. c. (1848). *A. spinulosum*, var. *dilatatum*, forma *anadenium* Robinson, RHODORA, ix. 84 (1907).—Greenland and Labrador to British Columbia, south to the uplands of New England, Pennsylvania, Michigan, Idaho and Oregon, and on the mountains to North Carolina and Tennessee. Also eastern Asia.

GRAY HERBARIUM.

¹ Kunze, Am. Journ. Sci. ser. 2, vi. 83, 84 (1848).

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